

**APPENDIX A2**

**MATERIAL PROPERTIES**



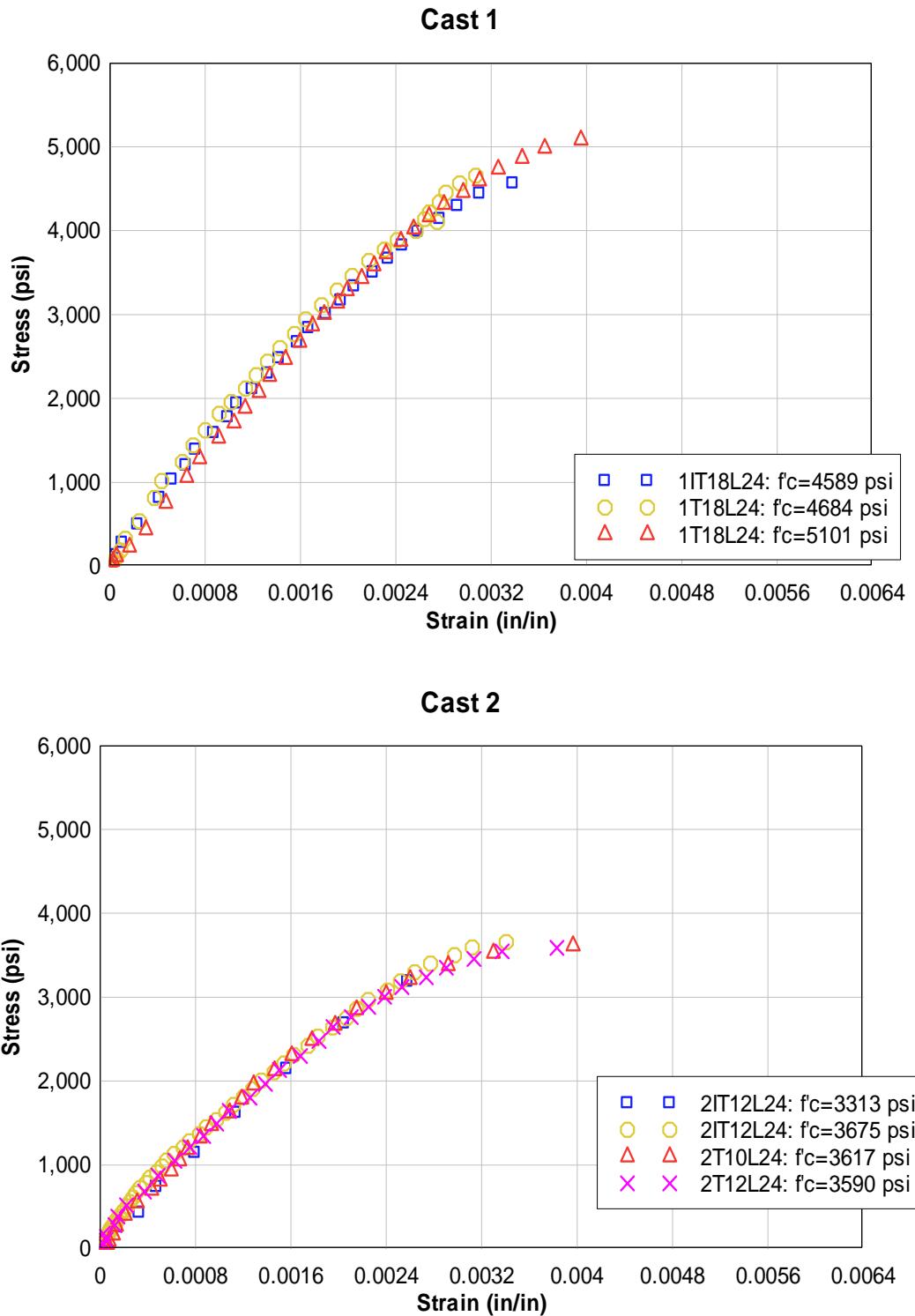


Figure A2.1: Stress-strain curves for stem concrete obtained from cylinder tests for group 1 and 2 specimens.

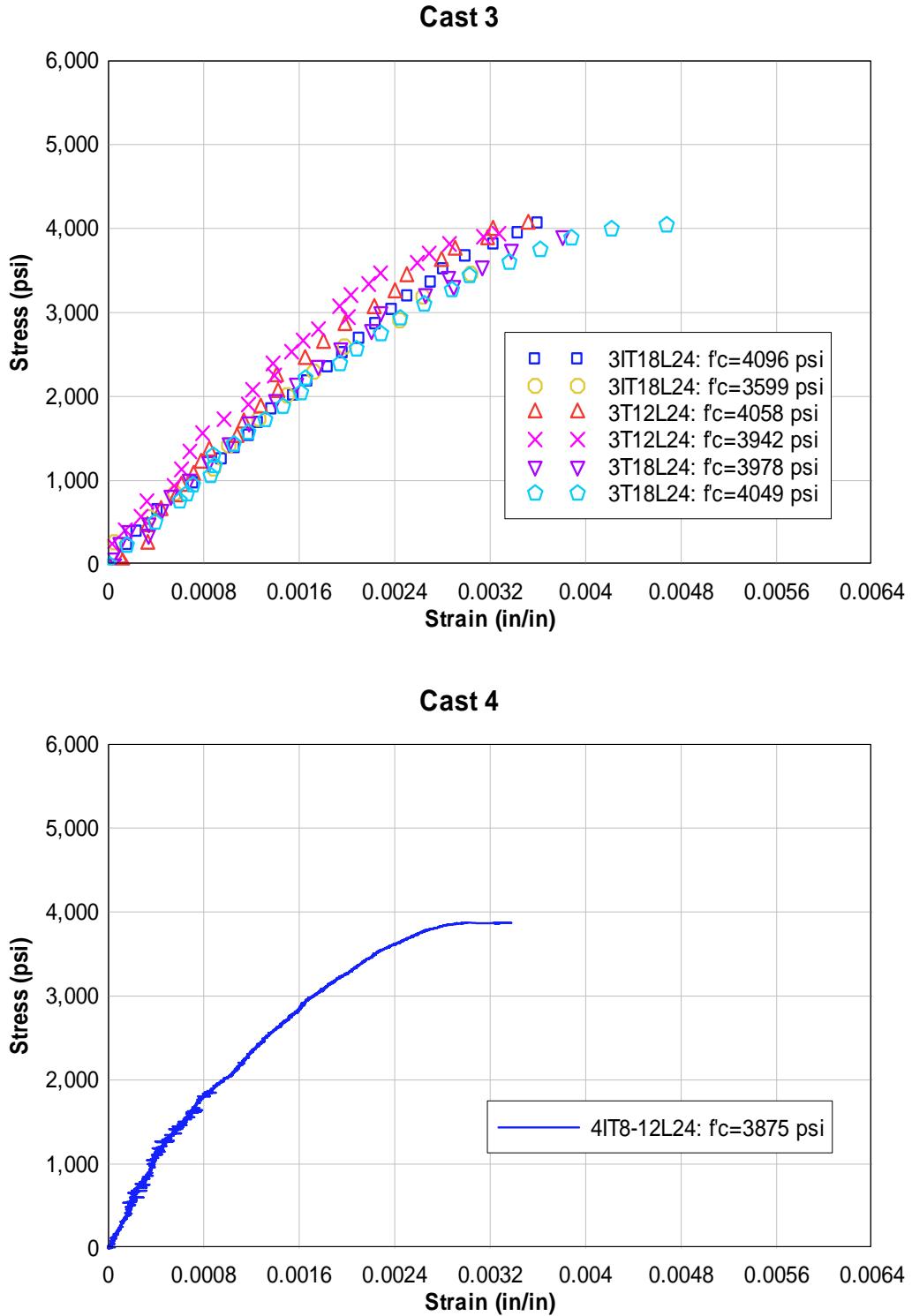


Figure A2.2: Stress-strain curves for stem concrete obtained from cylinder tests for group 3 and 4 specimens.

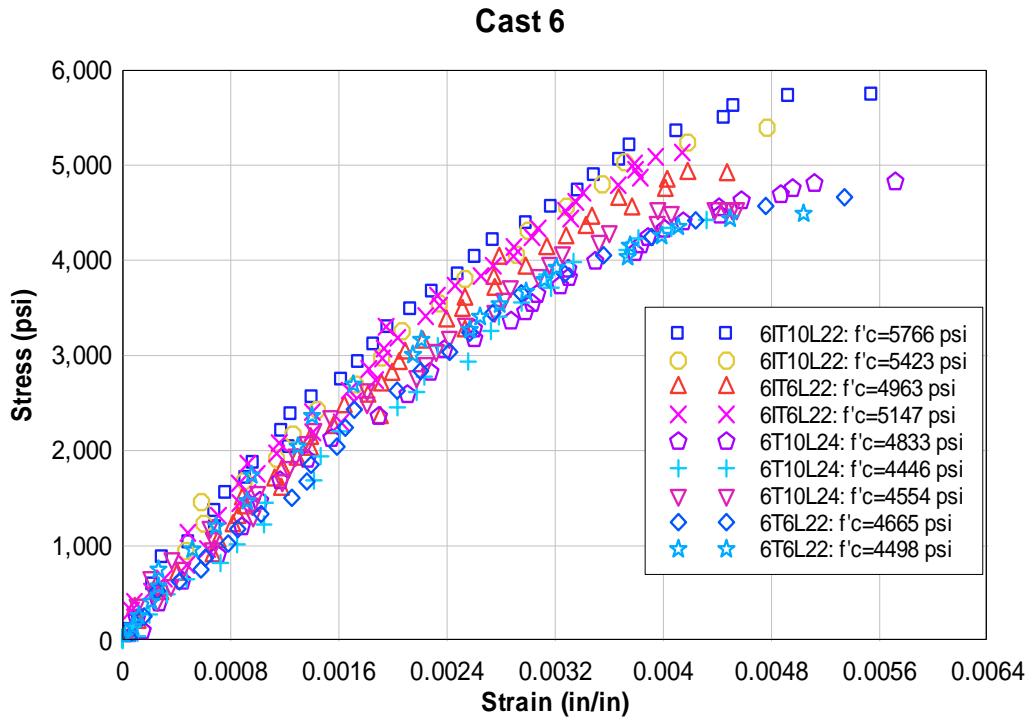
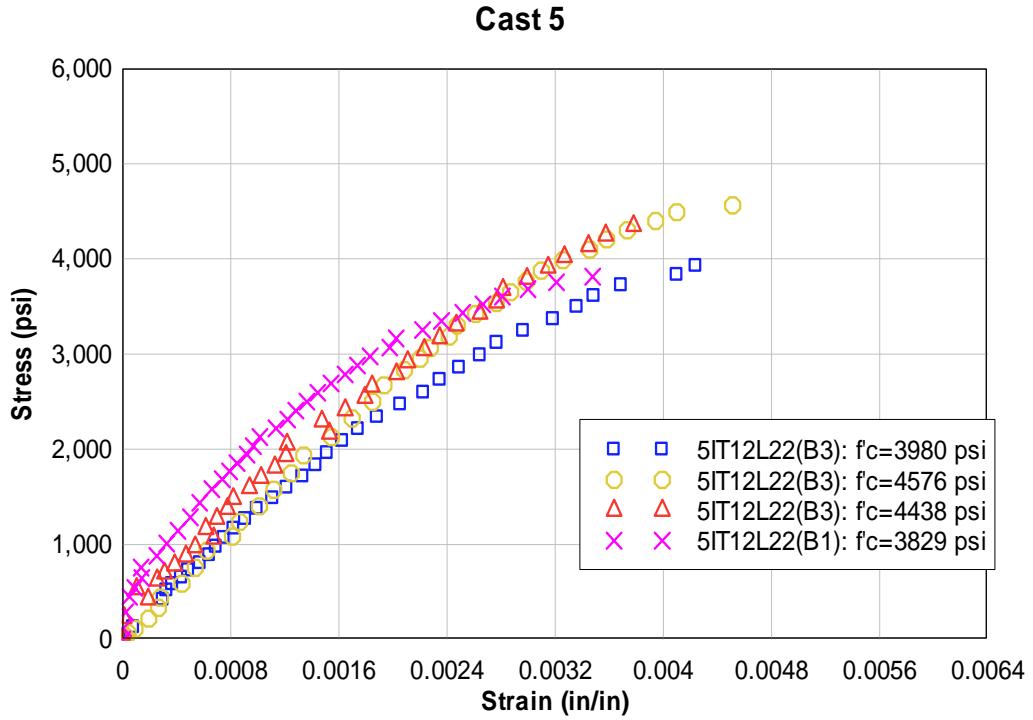


Figure A2.3: Stress-strain curves for stem concrete obtained from cylinder tests for group 5 and 6 specimens.

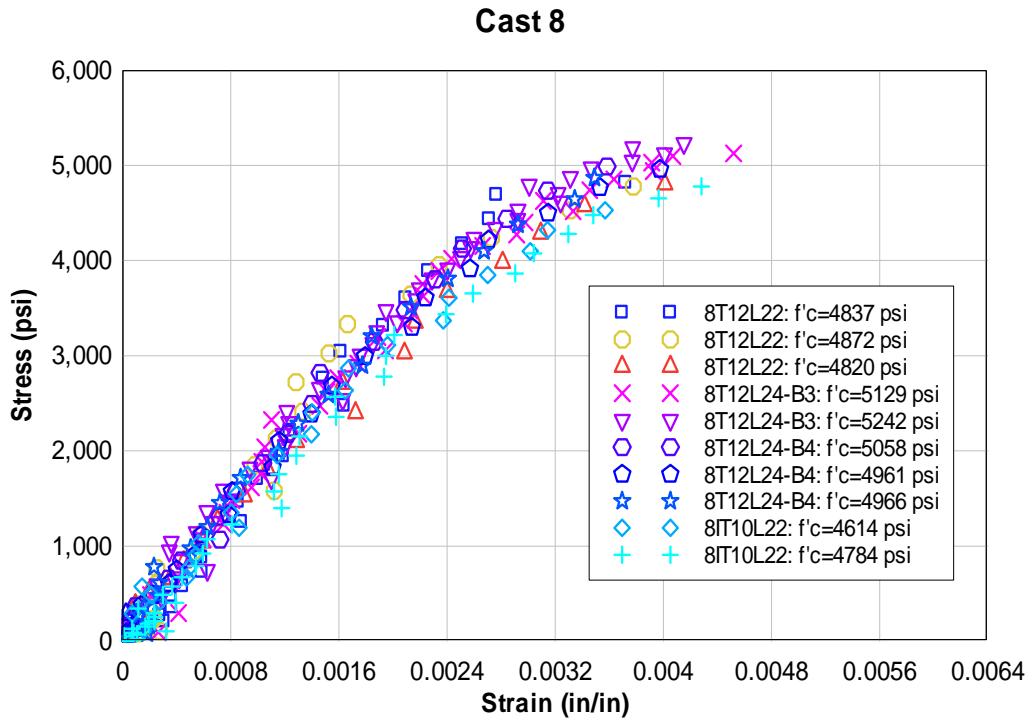
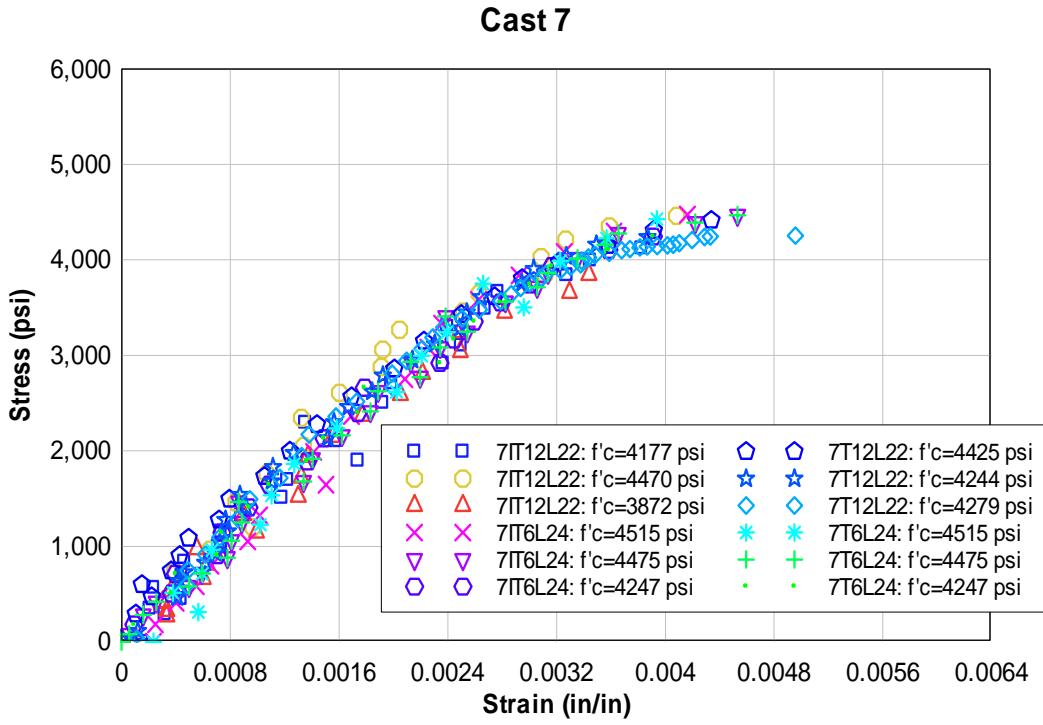
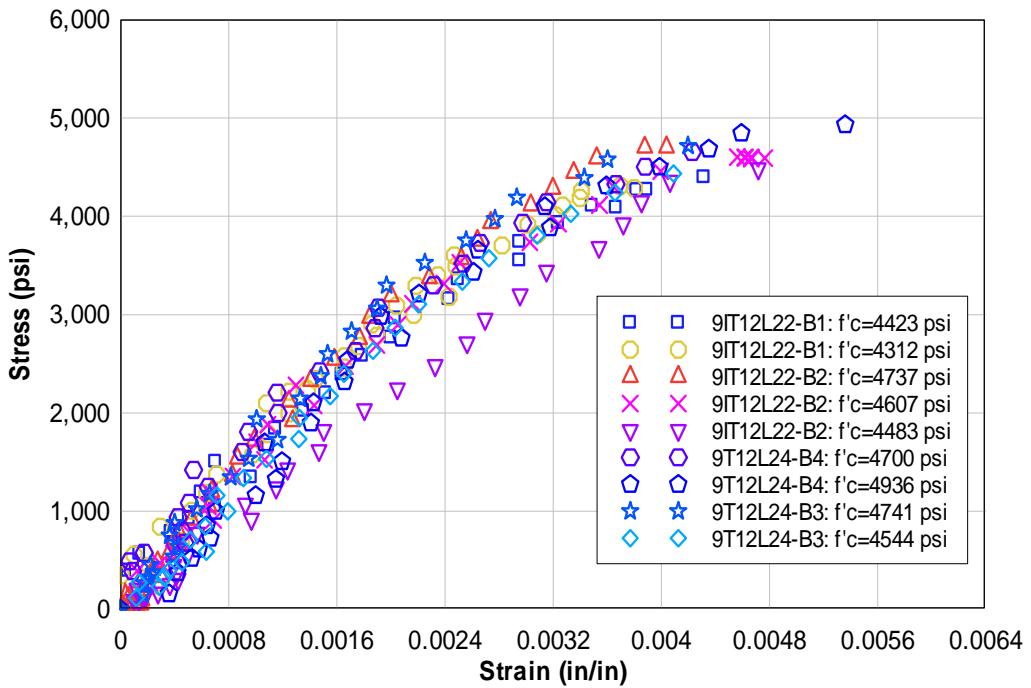


Figure A2.4: Stress-strain curves for stem concrete obtained from cylinder tests for group 7 and 8 specimens.

**Cast 9**



**Cast 10**

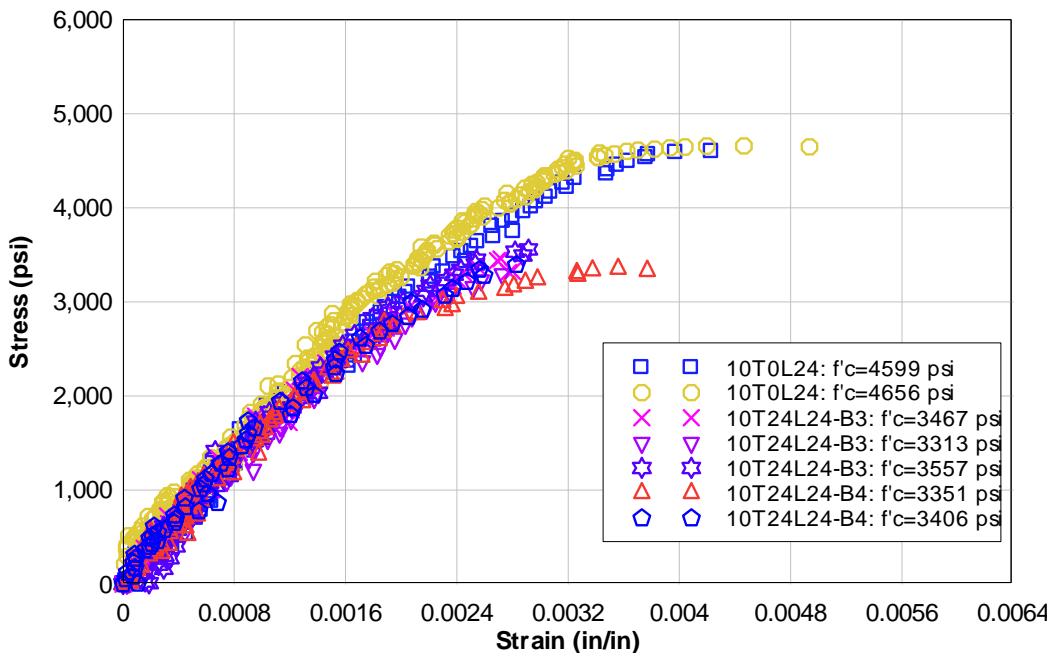


Figure A2.5: Stress-strain curves for stem concrete obtained from cylinder tests for group 9 and 10 specimens.

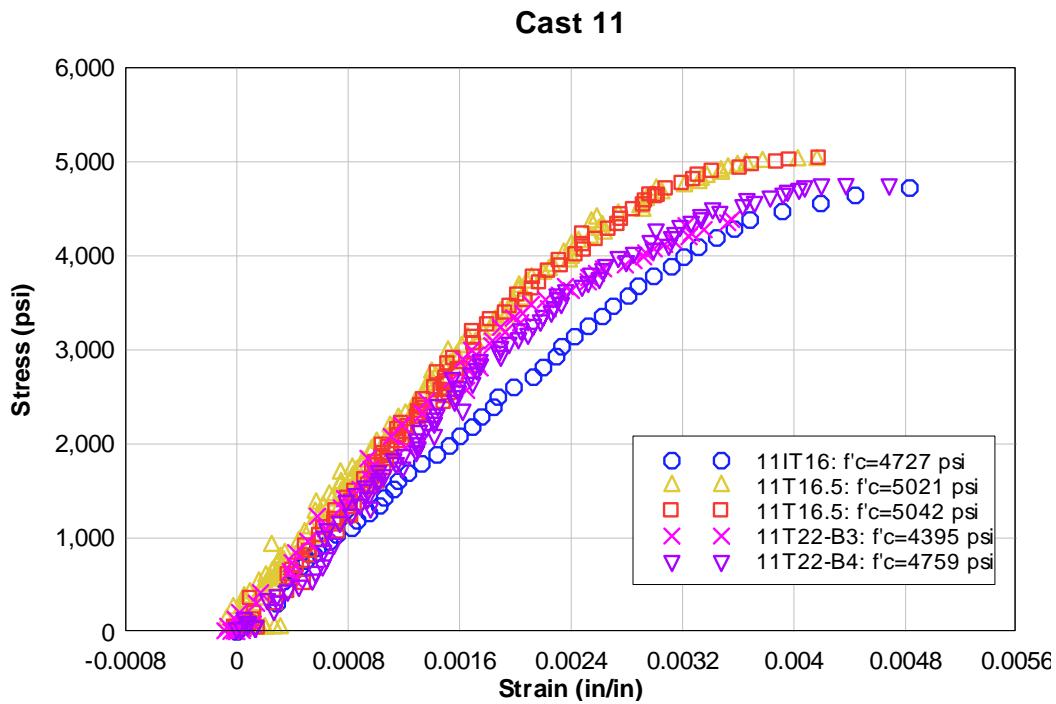


Figure A2.6: Stress-strain curves for stem concrete obtained from cylinder tests for group 11 specimens.

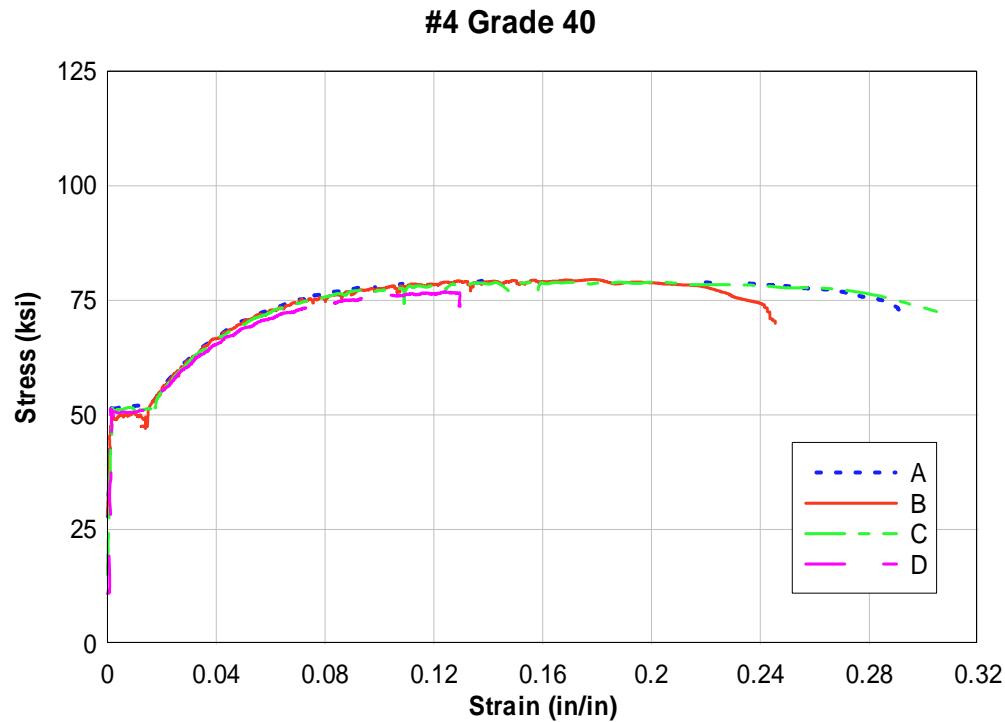


Figure A2.7: Stress-strain curves for #4-grade 40 rebar obtained from tension tests.

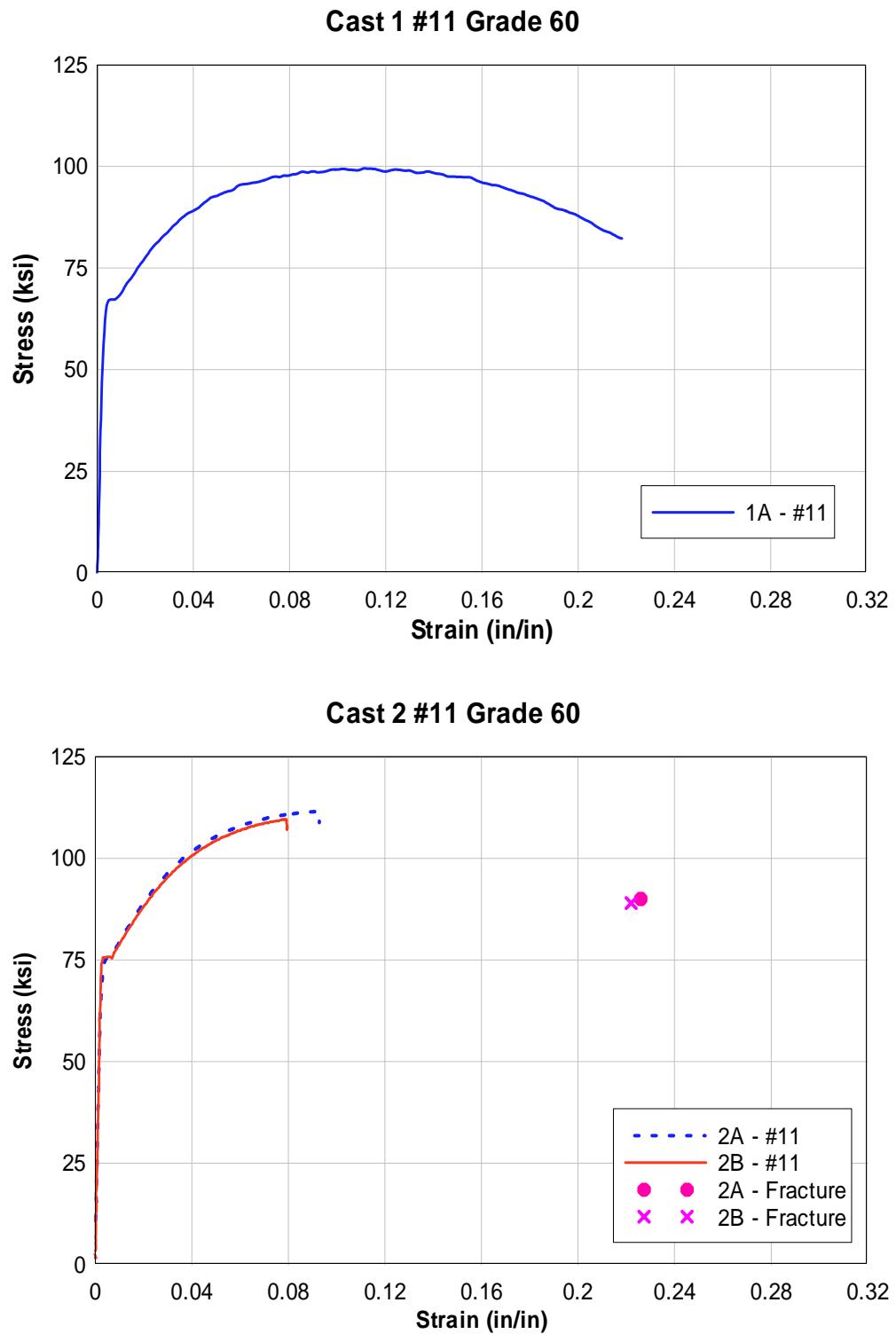
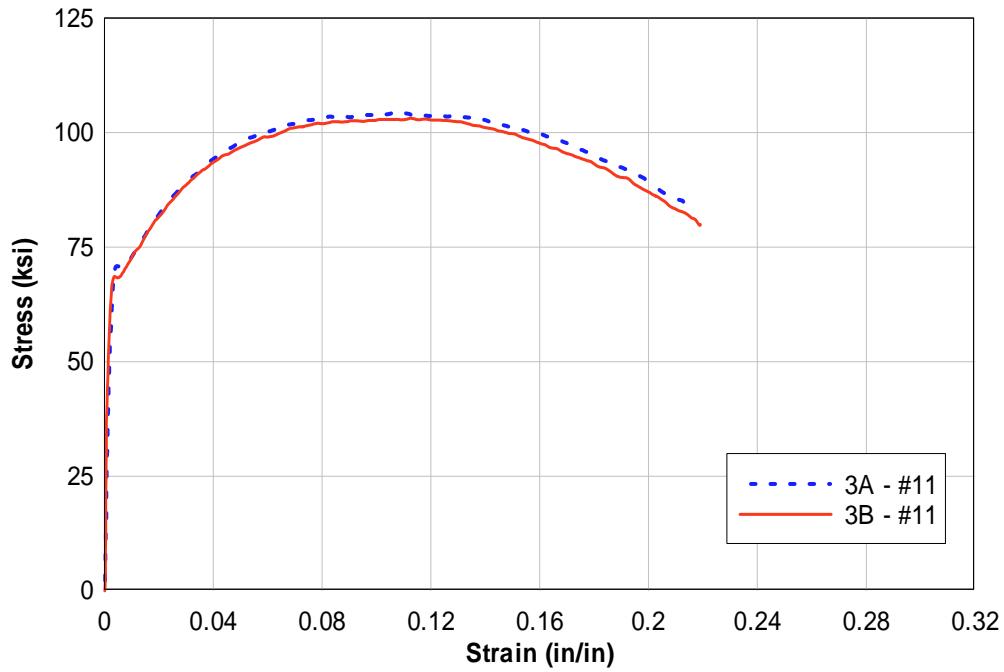


Figure A2.8: Stress-strain curves for #11 rebar obtained from tension tests for group 1 and 2 specimens.

**Cast 3 #11 Grade 60**



**Cast 4 #11 Grade 60**

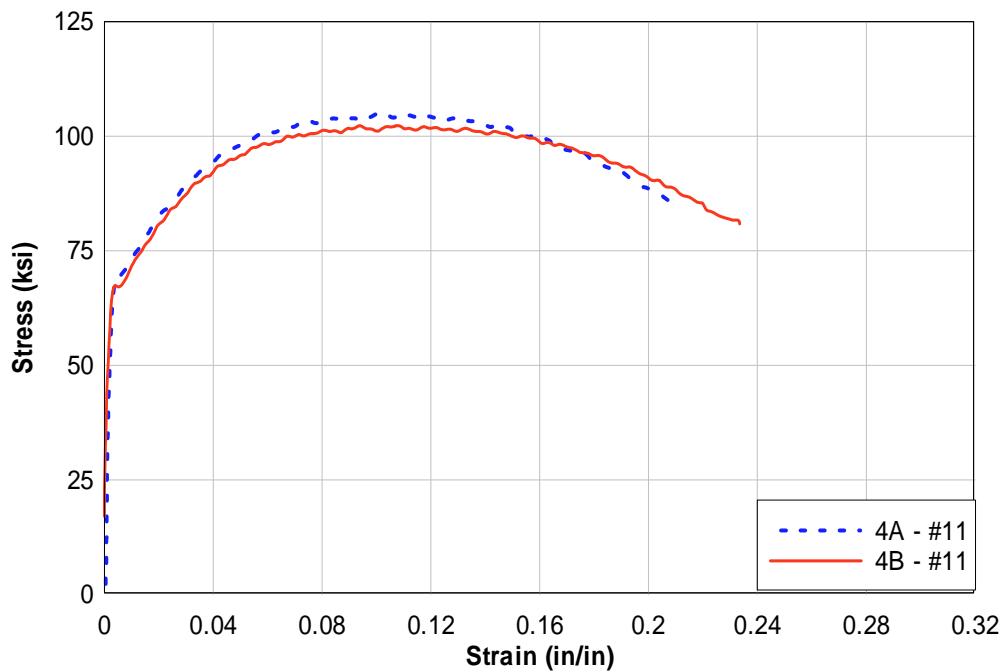


Figure A2.9: Stress-strain curves for #11 rebar obtained from tension tests for group 3 and 4 specimens.

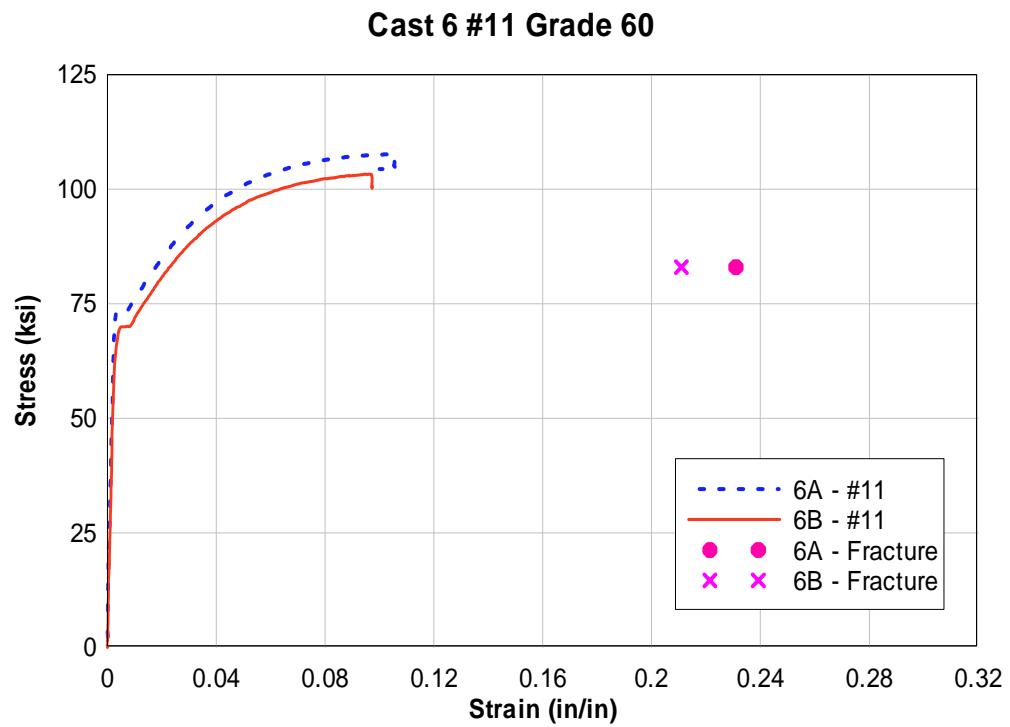
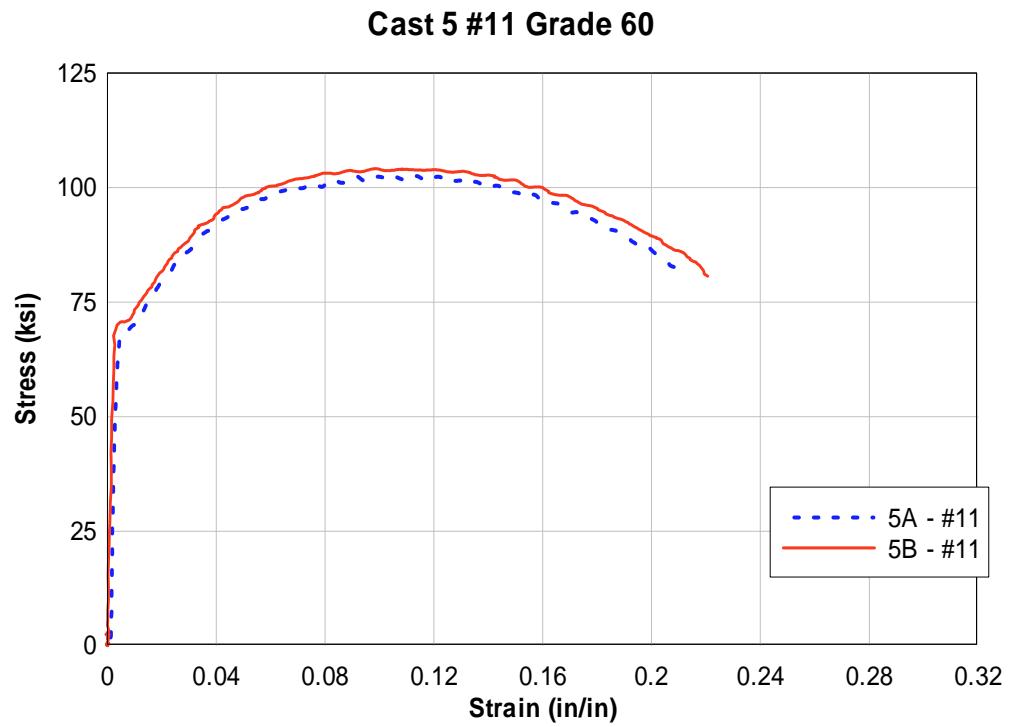
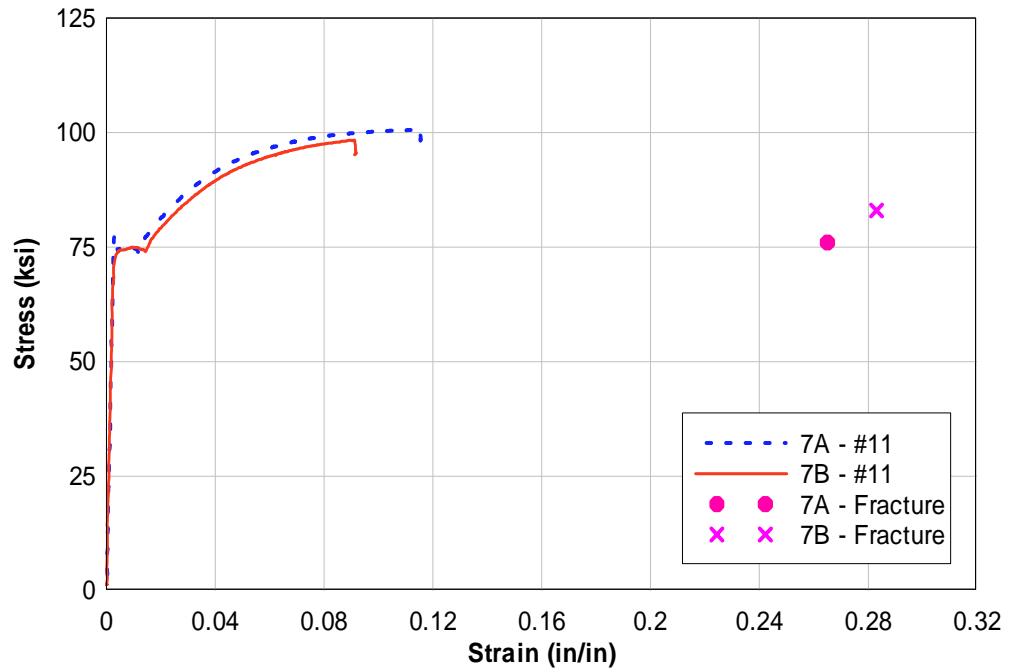


Figure A2.10: Stress-strain curves for #11 rebar obtained from tension tests for group 5 and 6 specimens.

**Cast 7 #11 Grade 60**



**Cast 8 #11 Grade 60**

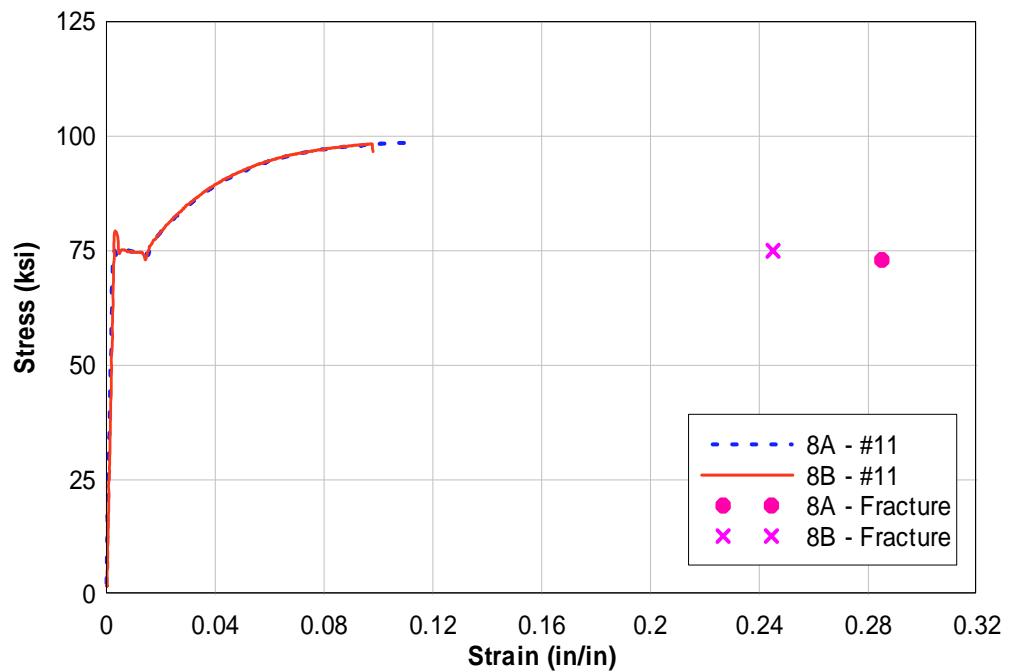


Figure A2.11: Stress-strain curves for #11 rebar obtained from tension tests for group 7 and 8 specimens.

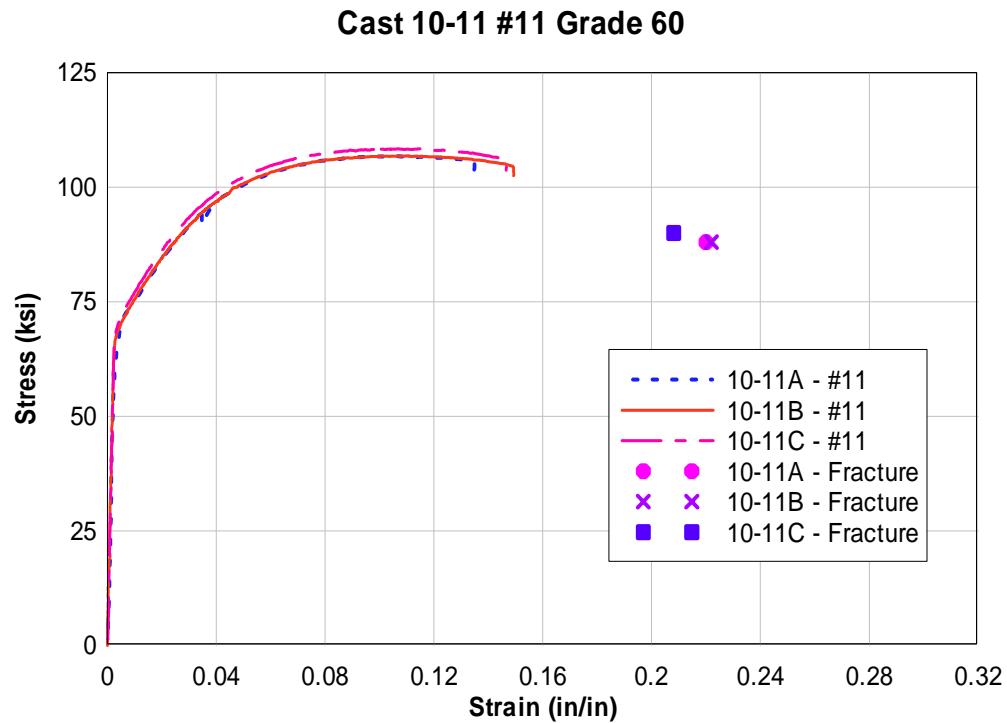
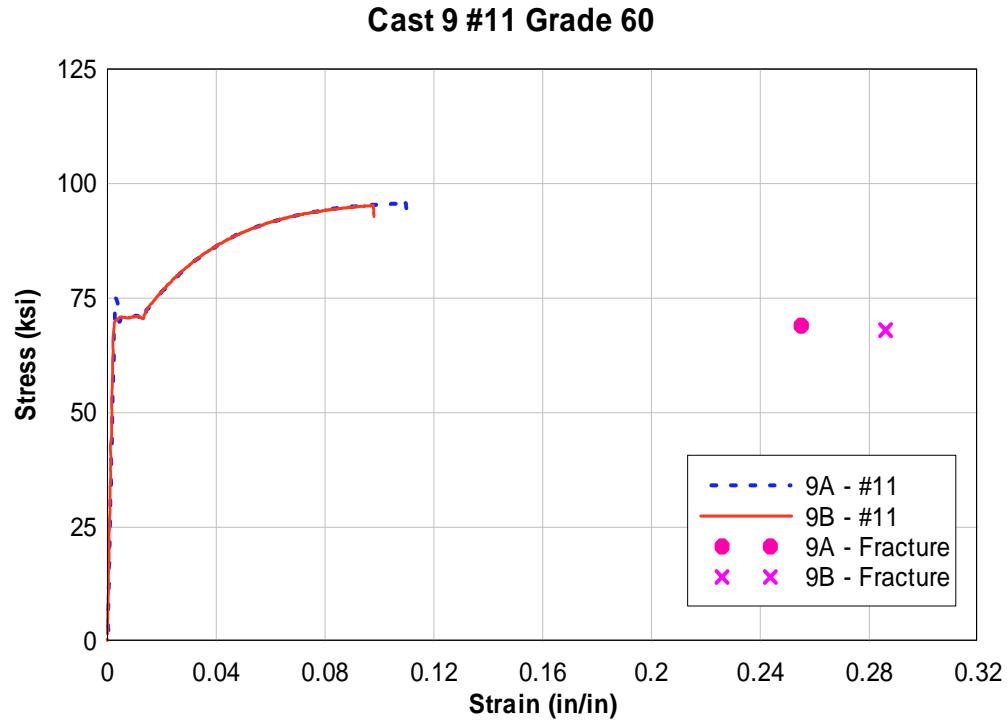
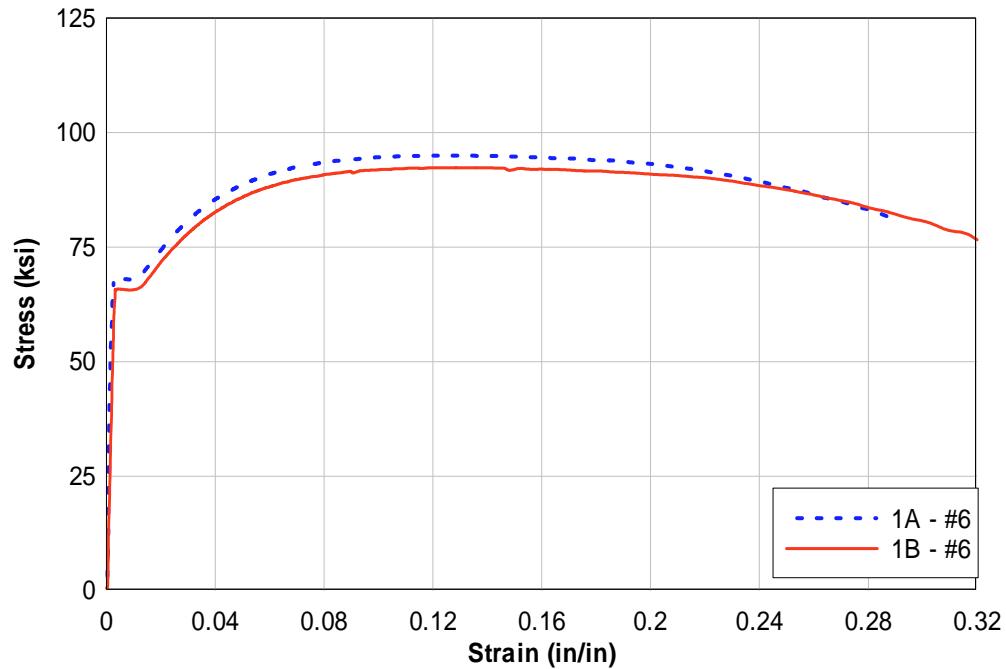


Figure A2.12: Stress-strain curves for #11 rebar obtained from tension tests for group 9, 10, and 11 specimens.

**Cast 1 #6 Grade 60**



**Cast 2 #6 Grade 60**

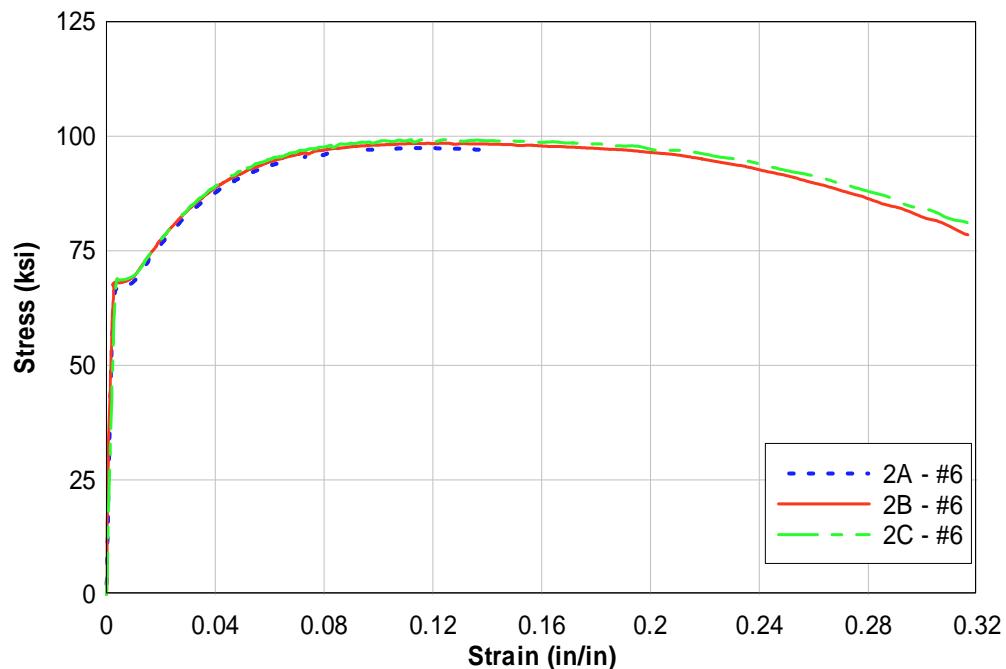


Figure A2.13: Stress-strain curves for #6 rebar obtained from tension tests for group 1 and 2 specimens.

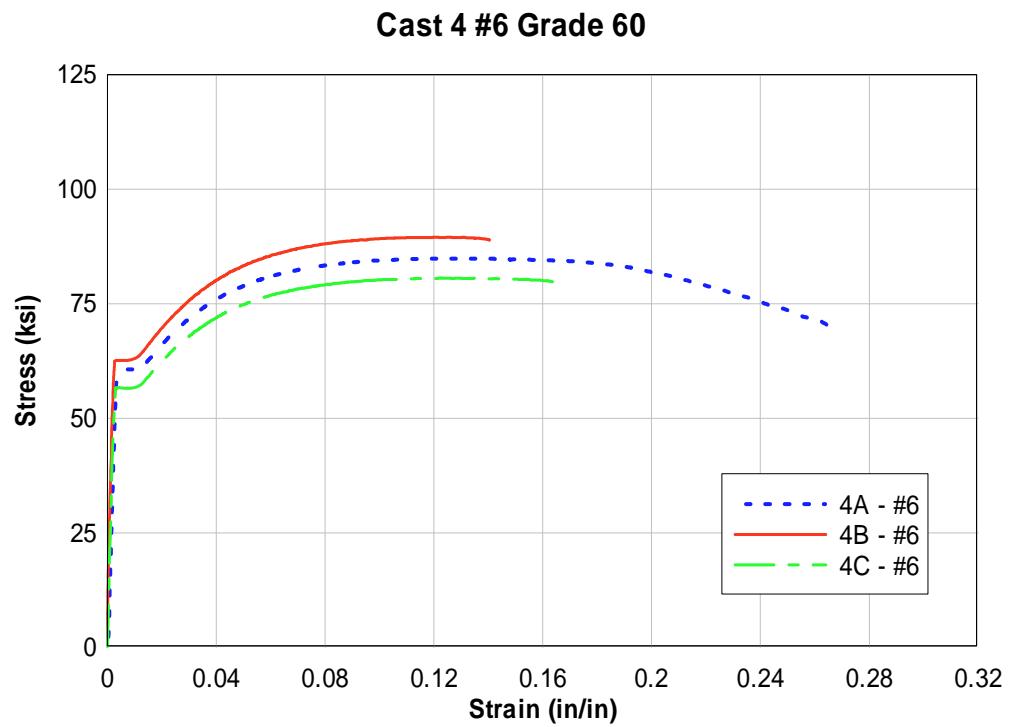
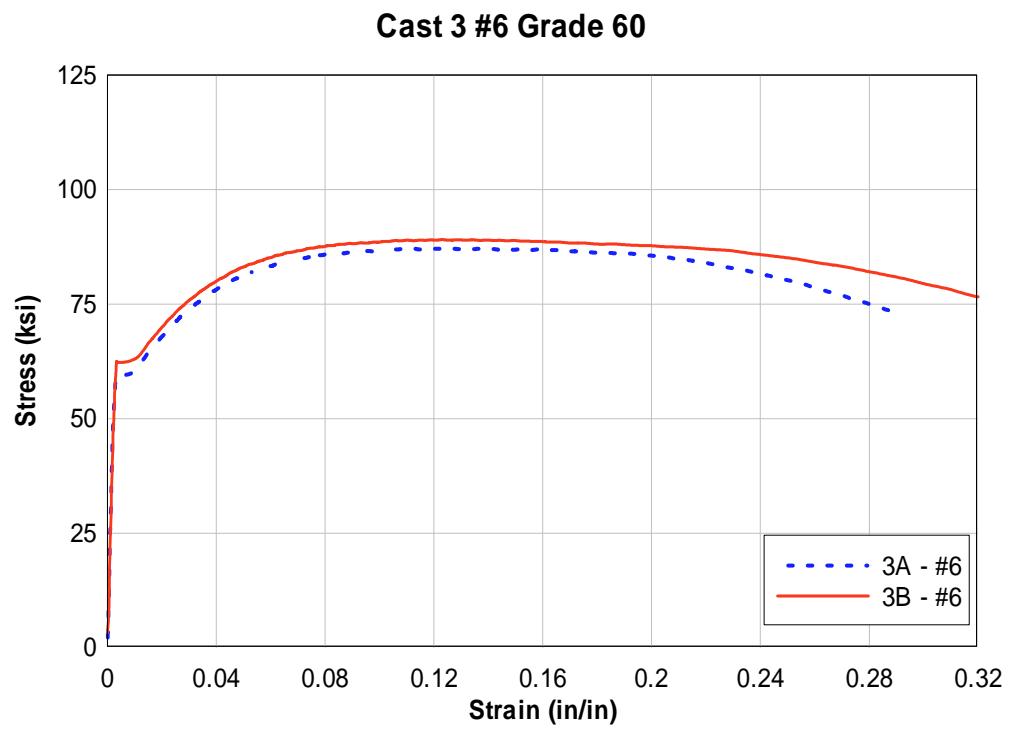
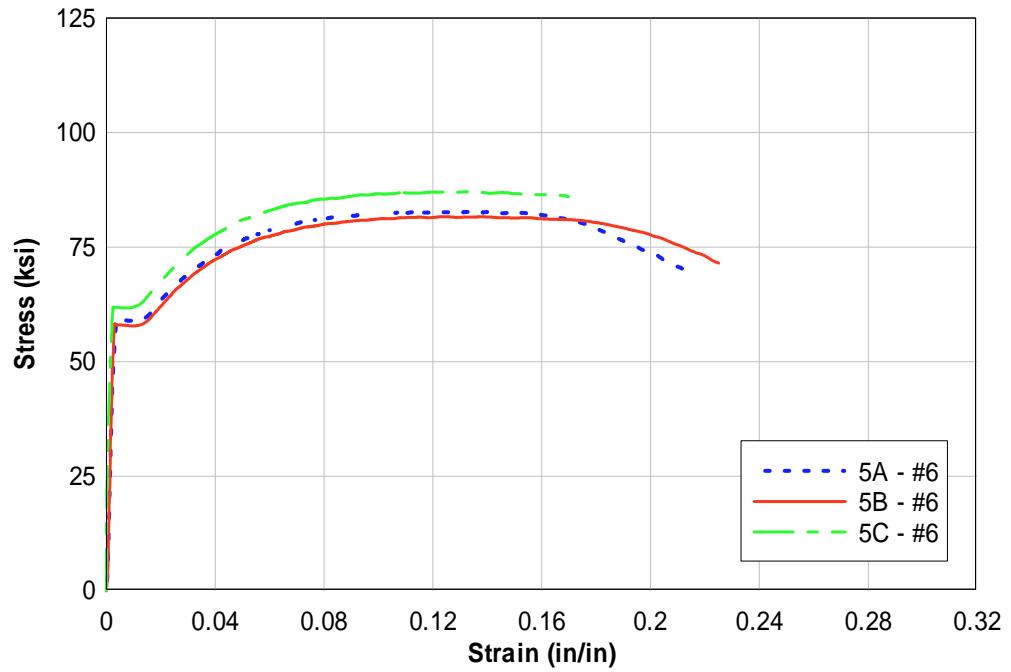


Figure A2.14: Stress-strain curves for #6 rebar obtained from tension tests for group 3 and 4 specimens.

**Cast 5 #6 Grade 60**



**Cast 6 #6 Grade 60**

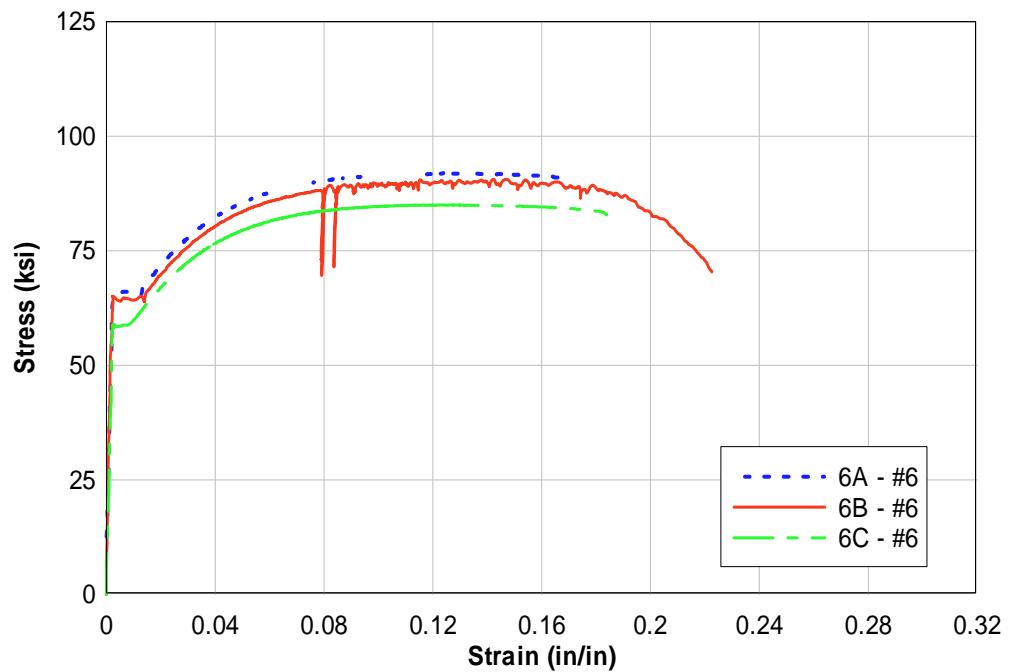
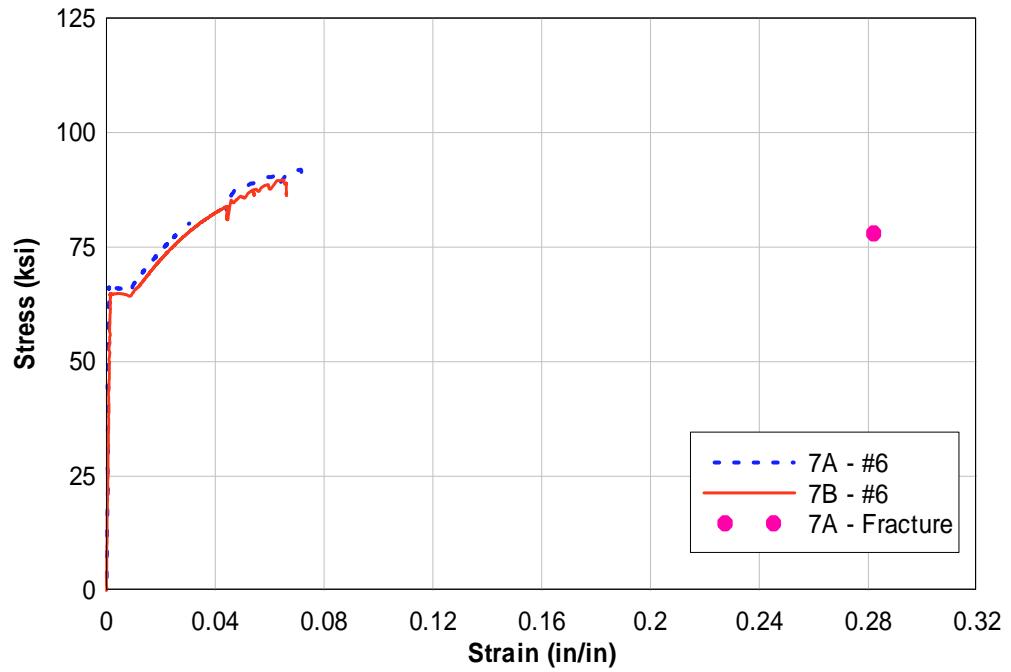


Figure A2.15: Stress-strain curves for #6 rebar obtained from tension tests for group 5 and 6 specimens.

**Cast 7 #6 Grade 60**



**Cast 8 #6 Grade 60**

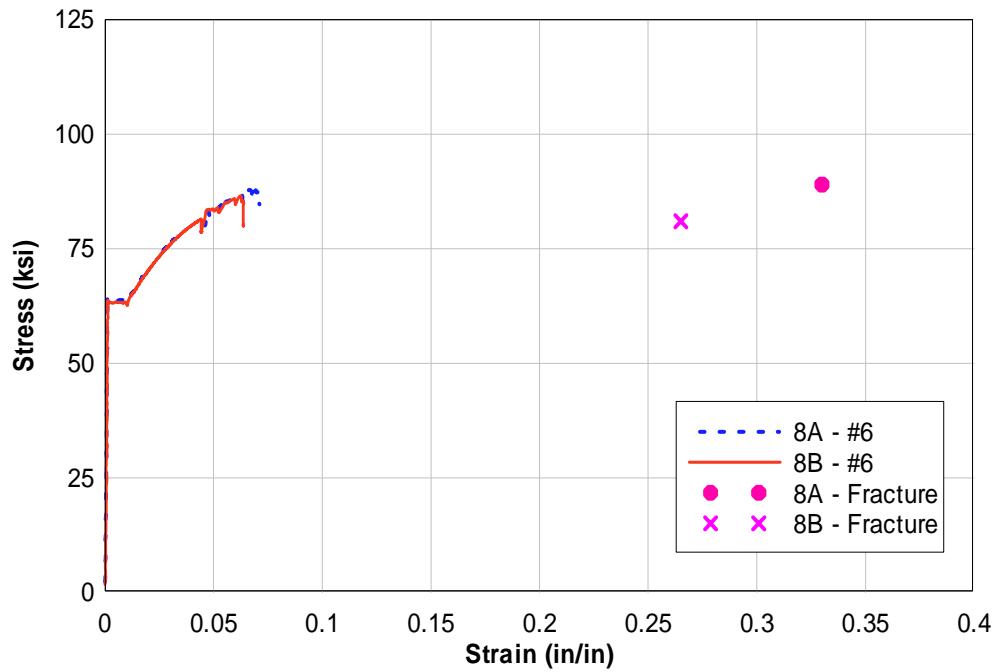


Figure A2.16: Stress-strain curves for #6 rebar obtained from tension tests for group 7 and 8 specimens.

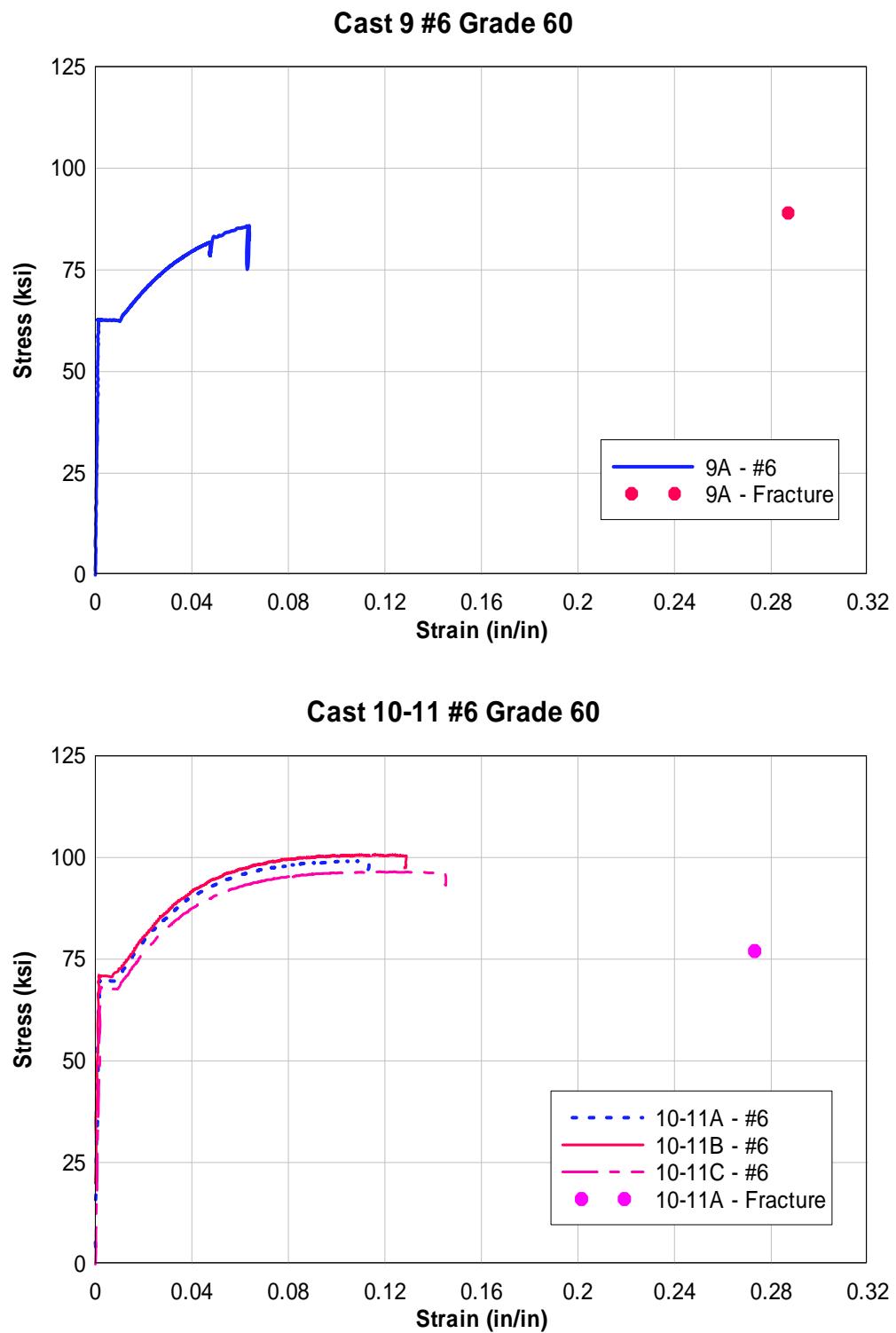
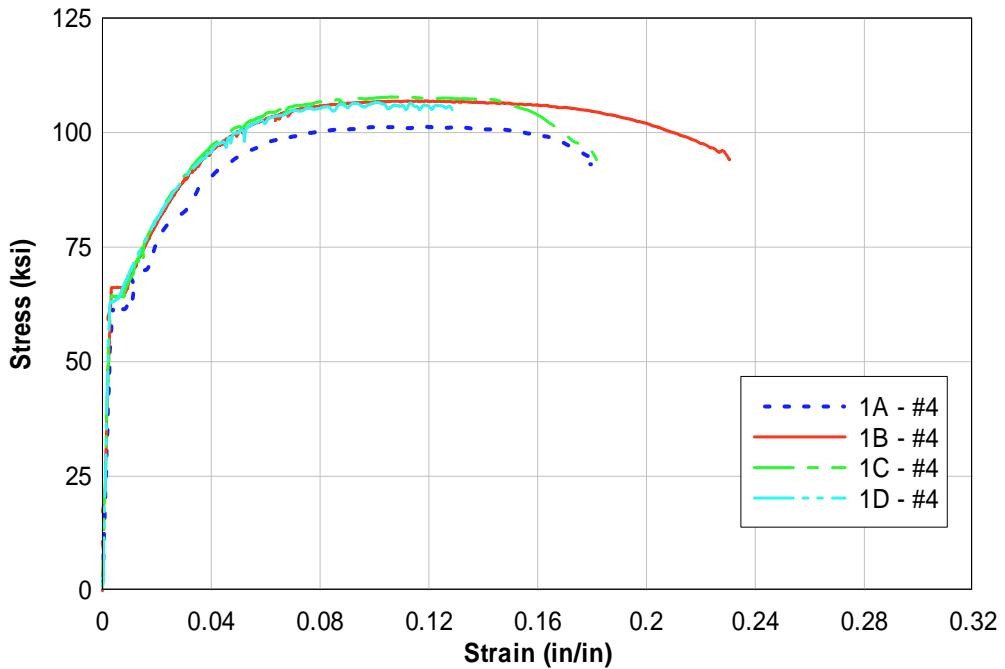


Figure A2.17: Stress-strain curves for #6 rebar obtained from tension tests for group 9, 10, and 11 specimens.

**Cast 1 #4 Grade 60**



**Cast 2 #4 Grade 60**

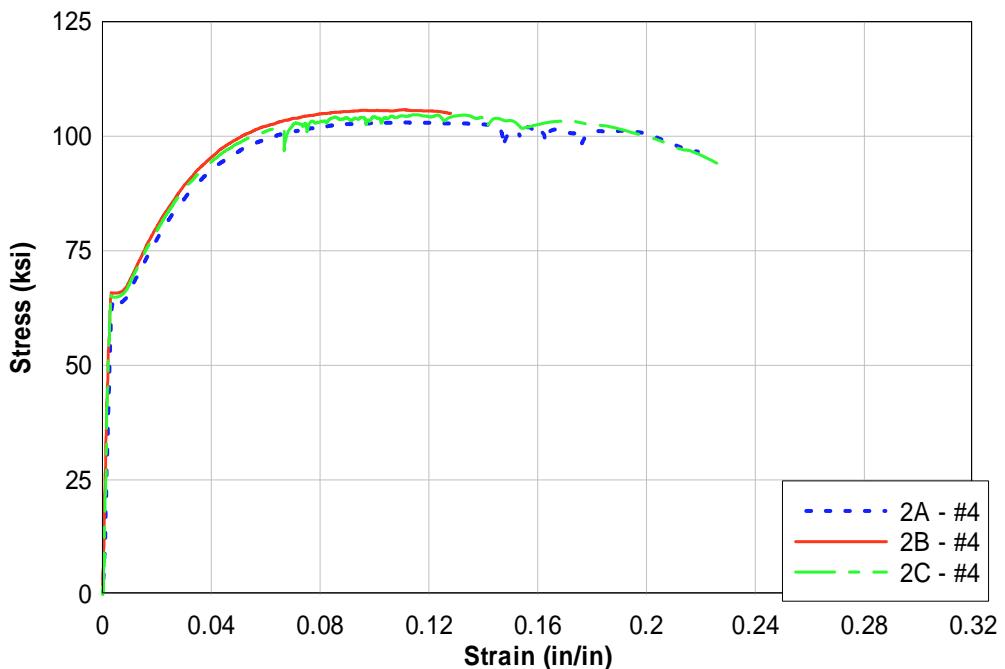
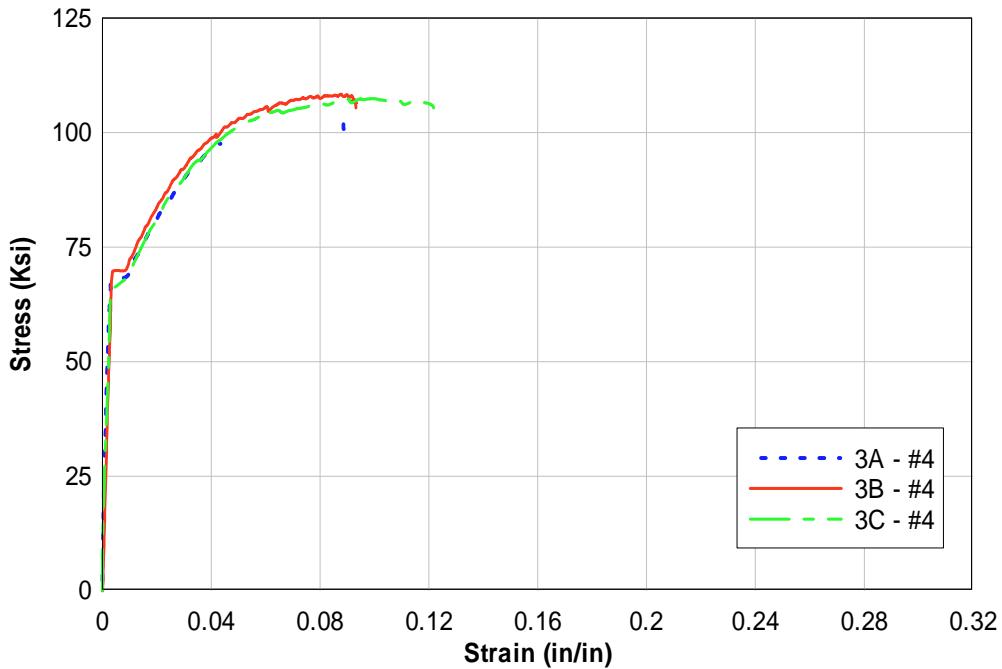


Figure A2.18: Stress-strain curves for #4 rebar (Grade 60) obtained from tension tests for group 1 and 2 specimens.

**Cast 3 #4 Grade 60**



**Cast 4 #4 Grade 60**

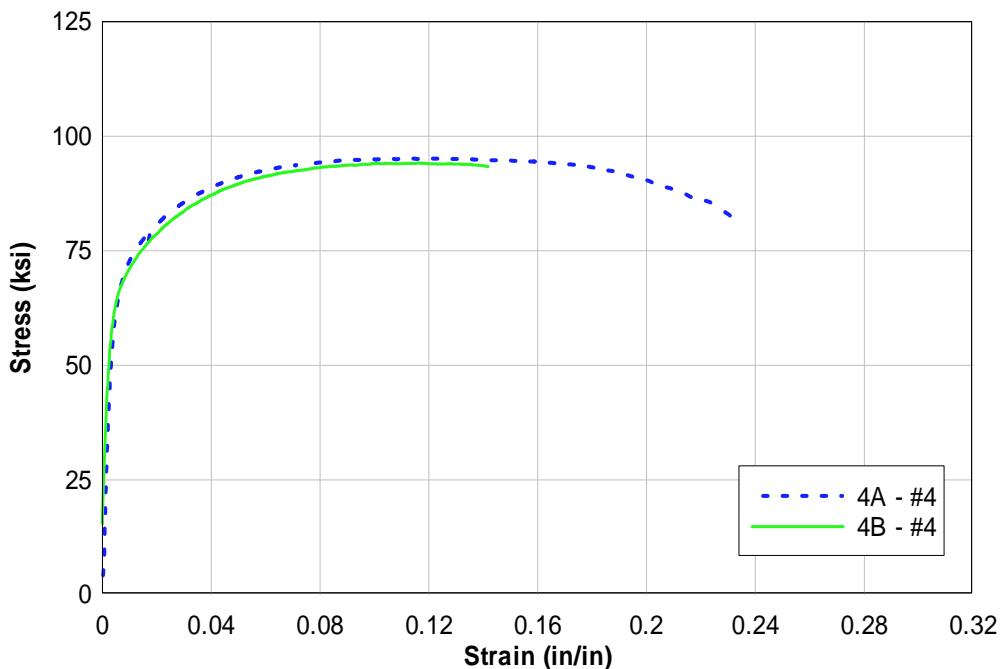


Figure A2.19: Stress-strain curves for #4 rebar (Grade 60) obtained from tension tests for group 3 and 4 specimens.

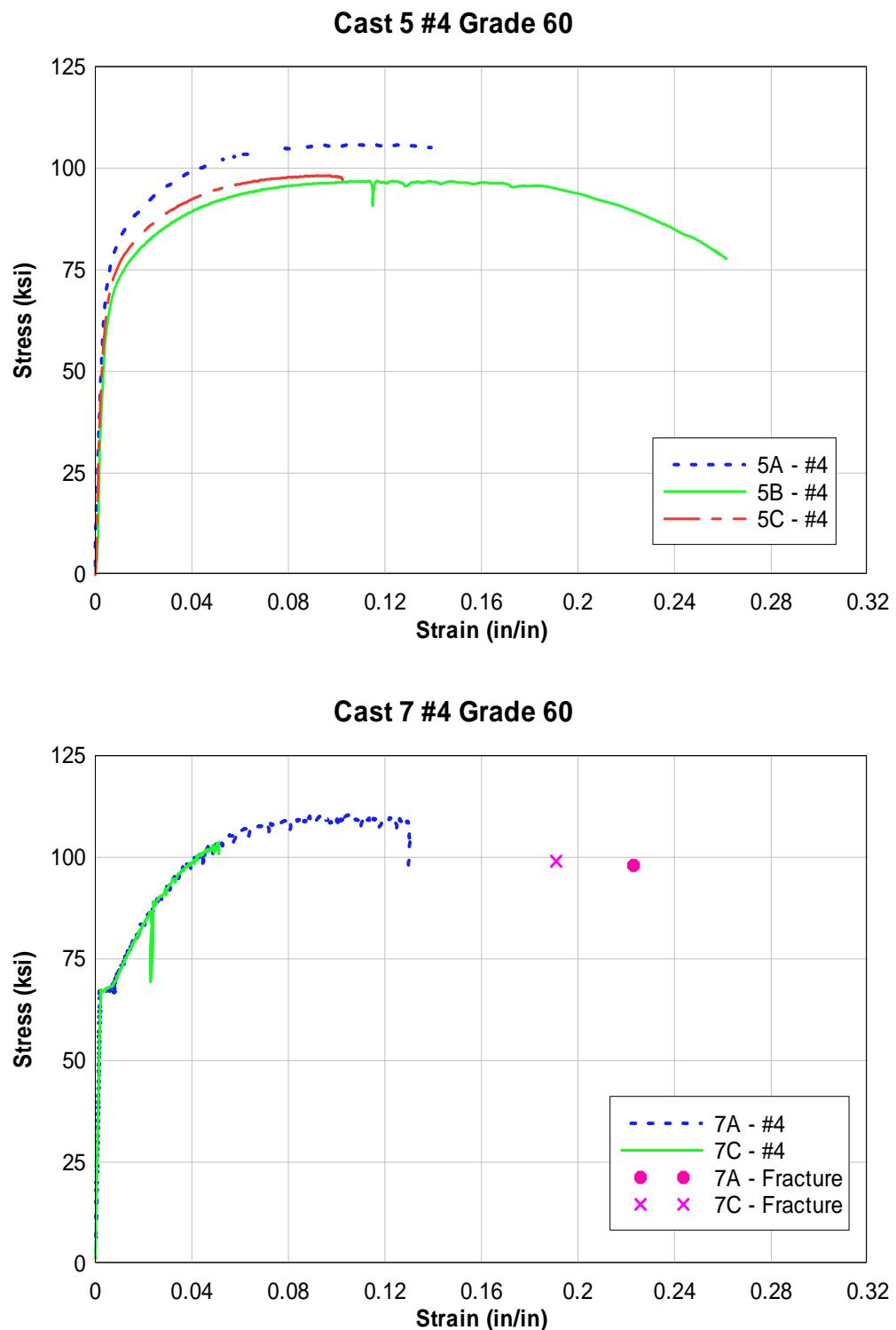
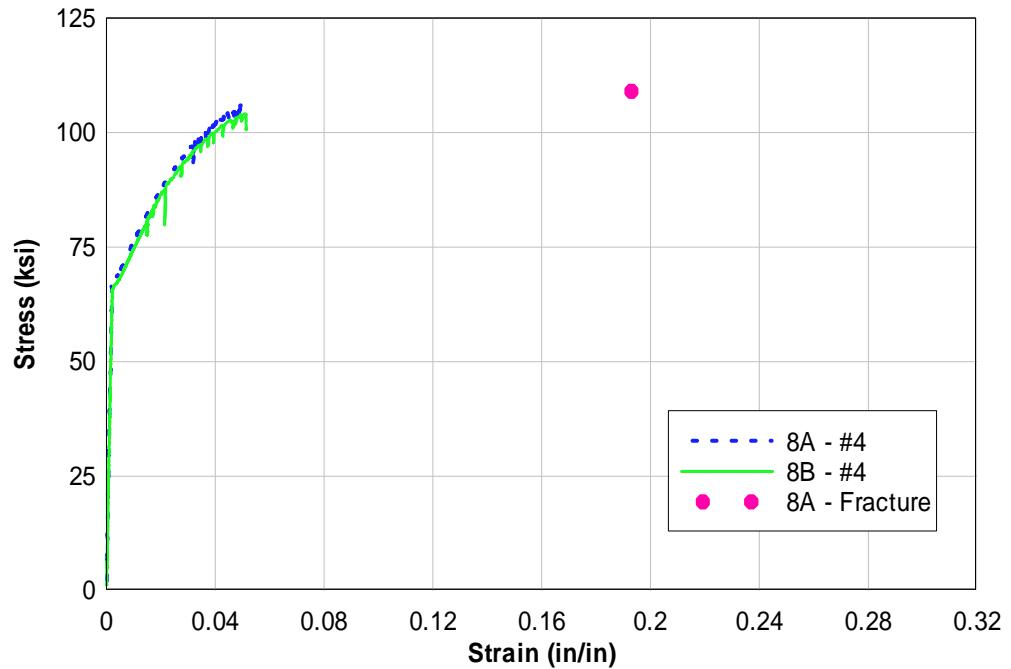


Figure A2.20: Stress-strain curves for #4 rebar (Grade 60) obtained from tension tests for group 5 and 7 specimens.

**Cast 8 #4 Grade 60**



**Cast 10-11 #4 Grade 60**

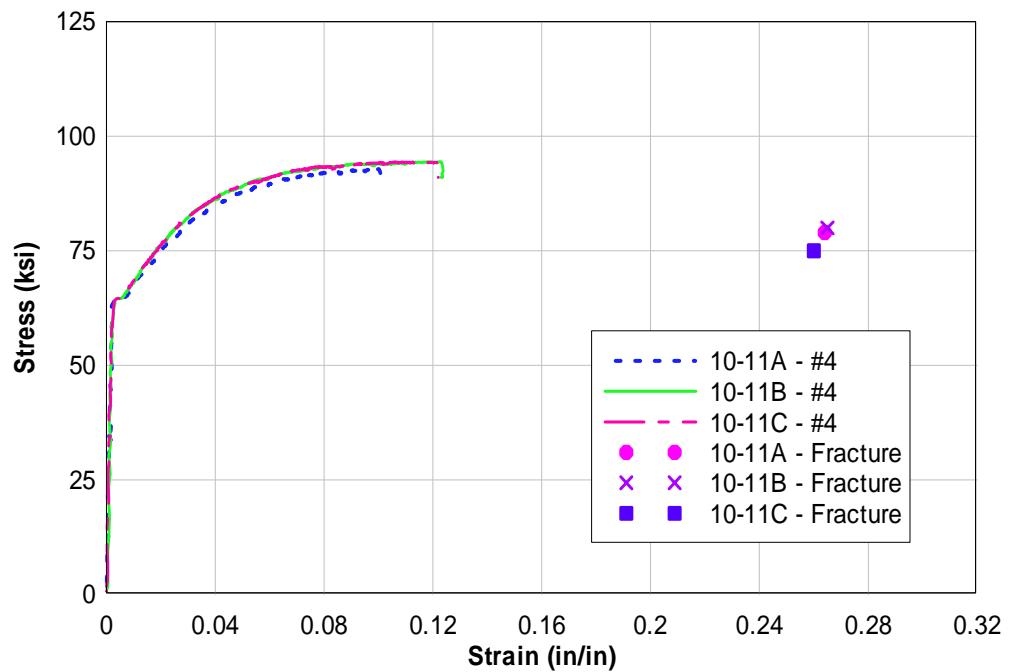


Figure A2.21: Stress-strain curves for #4 rebar (Grade 60) obtained from tension tests for group 8, 10, and 11 specimens.